sierra

INSTRUCTION MANUAL

VHF POWER SIGNAL SOURCE

MODEL 215A-150

AUTONETICS
METROLOGY REFERENCE FILES
JUL 24 1968
NOT TO BE REMOVED
WITHOUT AUTHORIZATION

SIERRA ELECTRONIC DIV.
OF
PHILCO
A SUBSIDIARY OF Ford Motor Company

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Stock No. 950000075

Warranty

SIERRA ELECTRONIC DIVISION, PHILCO CORPORATION warrants instruments manufactured by it and bearing Sierra commercial model numbers, except Ion Gauge Tubes, to be free from defective material and factory workmanship and agrees to repair such instruments, which under normal use and service, disclose the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing any such instrument which in our sole opinion upon our examination proves to be so defective, when returned to our factory, transportation prepaid by the purchaser, within one year from the date of original purchase from us.

This warranty does not apply to any of our products which have been repaired, worked upon or altered by persons not authorized by us so as, in our sole judgment, to injure the stability or reliability of such instrument, or which have been subject to misuse, negligence or accident, or the serial number of which has been altered, effaced, or removed. Neither does this warranty apply to any of our products which have been connected, installed, used or adjusted otherwise than in accordance with the instructions furnished by us. Nor does SIERRA ELECTRONIC DIVISION, PHILCO CORPORATION assume any liability for consequential damages, and in any event our liability shall in no case exceed the original purchase price of the instrument. Accessories, including but not limited to all vacuum tubes, fuses and batteries, not of our manufacture used with this product are not covered by this warranty.

SIERRA ELECTRONIC DIVISION, PHILCO CORPORATION reserves the right to make changes in the design or construction of any of its instruments at any time without incurring any obligation to make any changes whatever on units previously purchased.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to represent nor assume for us any liability in connection with the sale of our products other than set forth herein.

Manufactured by

SIERRA ELECTRONIC DIV.
OF
PHILCO
A SUBSIDIARY OF Ford Motor Company

AREA CODE 415 – TELEPHONE 326-2060 TWX 492-9224

INSTRUCTION MANUAL
For
VHF POWER SIGNAL SOURCE

MODEL 215A-150

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050164

SUMMARY OF TECHNICAL SPECIFICATIONS

FREQUENCY	
Range	50-150 mc
Calibration	±2%
Stability	±0.05% Per hour after one hour warm-up with constant load, power output and line voltage
Resetability	±0.1%
OUTPUT POWER	
Capability	80 watts nominal, 50 watts minimum
Range	50 mw to 100% of maximum output
Stability	±0.2 db per hour after 1/2 hour warmp-up with constant line voltage, and load ±0.2 db for 105-125 volts ac line voltage variation
Monitor Output	35 db below main output, nominal
Harmonic Output	50 db down, approximately
MODULATION	
Type	AM, Sine or Square Wave
Capability, Sine Wave	100% at 10 watts output to 60% at 50 watts output
Input	40 volts rms
Frequency, Sine Wave	200 - 30,000 cps
Frequency, Square Wave	1000 - 10,000 cps
Rise Time Capability	10 microseconds
Input Impedance	20,000 ohms, approximately

CONNECTORS	
Output	Type N, female
Frequency Monitor	Type BNC, female
External Modulator	Type BNC, female
POWER	115 volts, 60 cycle 425 watts
DIMENSIONS	
In Cabinet	
Width	23-1/4 inches
Height	16-3/16 inches
Depth	17-1/4 inches
Out of Cabinet (Relay rack mounting)	
Width	19 inches
Height	12-1/4 inches
Depth	15-3/4 inches
WEIGHT	109 pounds

OPERATING AND MAINTENANCE INSTRUCTIONS

VHF POWER SIGNAL SOURCE MODEL 215A-150

1.0 GENERAL DESCRIPTION

The subject equipment is a power oscillator designed to provide a signal of adequate stability and power output for calibrating and testing Bi-Directional Power Monitors and Termination Wattmeters. The output power is adjustable from zero to fifty watts over the frequency range 50 to 150 mc/sec into a 50 ohm load. Low pass r-f filters are incorporated in the output circuit to reduce harmonic content.

The signal source may be amplitude modulated in the screen circuit by a suitable external audio source. The unit is designed for standard 19 inch relay rack or cabinet mounting with operating controls, plate current meter, frequency monitoring connector and r-f output connector on the front panel. The signal source is self-contained including power supply and enclosed within easily removable covers to protect the equipment and operating personnel.

2.0 FRONT PANEL CONTROLS:

The following operating controls are provided on the front panels:

2.1 LINE ON switch energizes the filaments and the tube cooling blower as indicated by the clear lens neon pilot light.

2.2 H.V. ON switch energizes the H.V. supply after a 60 second time delay functions as indicated by the red lens neon pilot light.

2.3 BANDSWITCH selector determines the frequency range to be used. Position "A" for 85 to 150 mc/sec. and position "B" for 50 to 85 mc/sec output. The bandswitch actuates two coaxial relays which select the Low Pass r-f filter for the band in use.

2.4 TUNING dial is calibrated in two ranges to indicate the output frequency in megacycles.

2.5 RF LEVEL control varies the oscillator screen voltage to provide the desired power output in conjunction with the coupling control.

2.6 COUPLING control provides a means of optimizing the transfer of r-f power from the oscillator tank circuit to the output circuit. This control should not be used as a means of adjusting power output.

3.0 CIRCUIT DESCRIPTION

Reference is made to Schematic Diagram E-10392-3. The output frequency is obtained from a push-pull self-controlled power oscillator employing two tetrode vacuum tubes. The tank circuit of the oscillator is coupled by a variable capacitor and balun transformer through a low pass filter to the output connector. The screen voltage of the oscillator is varied to provide an adjustable r-f power output level. Amplitude modulation, if desired, is accomplished by applying an external audio source across an audio choke in the screen circuit.

Direct current voltage is supplied from an electronically stabilized power supply whose output is adjusted to +860 volts by means of a chassis mounted potentiometer. The supply will maintain stable output voltage for input line voltages from 107 to 130 volts ac.

4.0 OPERATING PROCEDURE

CAUTION: Do not exceed 200 ma. plate current. Always optimize power output with the coupling control. Use the r-f level control to adjust power output. Do not switch bands with the r-f level control at high output position (clockwise). Always turn r-f level control to minimum (full counterclockwise), then switch bands.

4.1 It is suggested that the following operating procedure be followed when the 215A-150 VHF Power Signal source is used. The unit utilizes relatively high voltages and is similar to an r-f transmitter in operation, therefore, the same operating precautions should be observed.

4.1.1 Connect a suitable 50 ohm termination load to the r-f OUTPUT connector.

4.1.2 Set COUPLING control to "9 o'clock" position (minimum coupling setting).

4.1.3 Set r-f LEVEL control to extreme counterclockwise (minimum power output) position.

4.1.4 Switch LINE toggle switch to ON position; this will energize the filaments and the tube cooling blower.

4.1.5 Switch H.V. toggle switch to ON position. After an automatic sixty second time delay the red pilot light will indicate the high voltage supply is on.

4.1.6 Select desired band and frequency.

4.1.7 Advance R.F. LEVEL control slightly and adjust the COUPLING control until an indication of power output is obtained, then set R.F. LEVEL control and optimize the COUPLING control for the desired output power level. Do not exceed 200 ma as indicated on the PLATE CURRENT meter.

4.1.8 Before switching frequency bands, turn R. F. LEVEL control to extreme counterclockwise position, then proceed again with steps 4.1.6 and 4.1.7.

5.0 MAINTENANCE

5.1 Air Filter

The air filter should be checked regularly and replaced when excessive dirt accumulates.

5.2 Blower

The blower is lubricated for the life of the unit and requires no maintenance.

5.3 Power Supply

In case of tube or component replacement in the power supply, the regulation characteristic and output dc voltage should be checked. The following procedure is suggested:

5.3.1 Connect a variac capable of adjusting input line voltage from 107 to 130 volts ac to P1.

5.3.2 Operate the signal source as per section 4 Operating Procedure. With 115 volts ac, line voltage, load the signal source to approximately 200 ma plate current.

5.3.3. Measure the voltage across C12; it should be 1015 volts dc approximately.

5.3.4 Measure the dc output voltage from junction of R1 - R2 to cold end of C12 (white wires). Adjust R5 potentiometer (REG ADJ on rear of chassis) for 860 volts dc.

5.3.5 Vary the input line voltage from 107 to 130 volts ac. The output dc voltage should remain essentially constant.

5.4 Oscillator

The Bandswitch contacts should be periodically inspected for proper tension and cleanliness. Replacement of oscillator tubes should not change dial calibration appreciably, however, if recalibration is necessary the following procedure is recommended:

5.4.1 Operate the unit as per section 4.0 Operating Procedure. Connect suitable frequency measuring equipment to FREQ MONITOR jack on front panel.

5.4.2 Check calibration at 150 mc with unit delivering 50 watts to termination load and coupling control optimized.

5.4.3 If dial calibration is determined to be too greatly in error, set frequency to exactly 150 mc, loosen the flexible coupler on the tuning drive shaft, then set dial to 150 mc and check frequency again. The stop attached to the tuning dial vernier mechanism should be set so that tuning is possible to just above 150 mc. This will prevent damage to the r-f output filters.

5.4.4 Check calibration from 85 to 150 mc on "A" band optimizing coupling at each check point. Calibration should be reasonably close.

5.4.5 Check calibration at 85 mc on "B" band; if the above procedure has been followed carefully, the "B" band calibration should be reasonably close.

REPLACEABLE PARTS LIST

PARTS REPLACEMENT

Standard components have been used in this instrument whenever possible. Both standard and special components may be ordered direct from the factory.

When ordering parts always include:

1. Sierra Stock Number.
2. Circuit Reference and Commercial Description.
3. Name, Model and Serial Number of the Instrument.

Parts for this instrument, or further service information may be obtained from:

SIERRA ELECTRONIC DIVISION
Philco Corporation
3885 Bohannon Drive
Menlo Park, California 94025

Area Code 415
Telephone 326-2060
TWX 492-9224

REPLACEABLE PARTS LIST

Schem. Ref. No.	Description	Sierra Stock No.	Mfr.	Dwg. or Mfr. No.	Tot. Quan.
B1	BLOWER, 3000 rpm, 80 cfm, 115 VAC 60 cycles	917200282	McLean	1NB300	1
C1	CAPACITOR, .01 mfd +20% -20% 600 VDCW, Disc Ceramic	901420103	Centralab	DD6103	2
C2	CAPACITOR, 500 mmf ±10%, 5000 VDCW, Ceramic	901400501	Centralab	858S-500	1
C3	CAPACITOR, .25 mf +20% -10% 600 VDCW, Paper	902110254	Sangamo	5006-.25	1
C4	CAPACITOR, 2 mf +20% -10% 600 VDCW, Paper	902110205	Sangamo	5006-2	1
C5	CAPACITOR, 500 mmf ±20% 1000 VDCW Disc Ceramic	901410501	Centralab	DD501	1
C6	CAPACITOR, 2.8-11 mmf, Air, Variable	902800111	E. F. Johnson	10L15	1
C7	CAPACITOR,		Sierra	SU-10451-2	1
C8	CAPACITOR, 7-66 mmf, Dual, Air Variable	902800660	E. F. Johnson	70FD20	1
C9	CAPACITOR,		Sierra	SU-10450-2	1
C10	CAPACITOR, .01 mfd, 20%, 1600 VDCW Paper	901070103	Sprague	MBS1	1
C11	CAPACITOR, 1000 mmf, 20%, 500 VDCW, Ceramic Feedthru	902610102	Erie	327-102	3
C12	CAPACITOR, 8 mf, 10%, 1500 VDCW, Oil filled paper	901200805	Sangamo	7115-8	1
C13	CAPACITOR, .1 mf, 20%, 400 VDCW Paper	901140104	Sprague	4TM-P1	1
C14	Same as C11				
C15	Same as C11				
C16	Same as C1				
CR1	Silicon Rectifier, 3000 PIV 750 ma (5 DI-56 Units)	910800008	Diode Inc.	DI-56	20
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
F1	FUSE, 5 amp, Slo-Blo	913200008	Littelfuse	313005	1
I1	PILOT LIGHT ASSEMBLY with red lens and NE 51 Neon Lamp	914200004	Drake	101N	1
I2	PILOT LIGHT ASSEMBLY with clear lens and NE 51 Neon Lamp	914200005	Drake	101N	1
J1	RECEPTACLE, Type N Panel Jack	914600037	Amphenol	UG-22B/U	1
J2	RECEPTACLE, Type BNC Panel Jack	914600036	Amphenol	UG-291/U	1
J3	RECEPTACLE, Type BNC	914600038	Amphenol	31-105	1
K1	RELAY, Coaxial, 115 VAC, Coil	912600001	Danbury Knudsen	316-010732-8	2
K2	Same as K1				
K3	RELAY, Time Delay, 115 VAC, 60 sec. delay	912800002	Industrial Timer	Type 90	1
L1	FILTER, Reactor, 8 HY, 300 ma dc	909200006	Chicago	RH-8300	1
L2	CHOKE, 10 HY, 50 ma dc	909200007	Triad	C-3X	1
L3	COIL, Plate Tank Assembly		Sierra	SU-10458-3	1
L4	CHOKE, R.F.		Sierra	SP-10456-1	2
L5	Same as L4				
M1	METER, 300 ma, 2-1/2" Rectangular Bakelite Case	911800027	Simpson	Model 127	1
P1	POWER CORD	916400002	Cornish Wire	3533	1

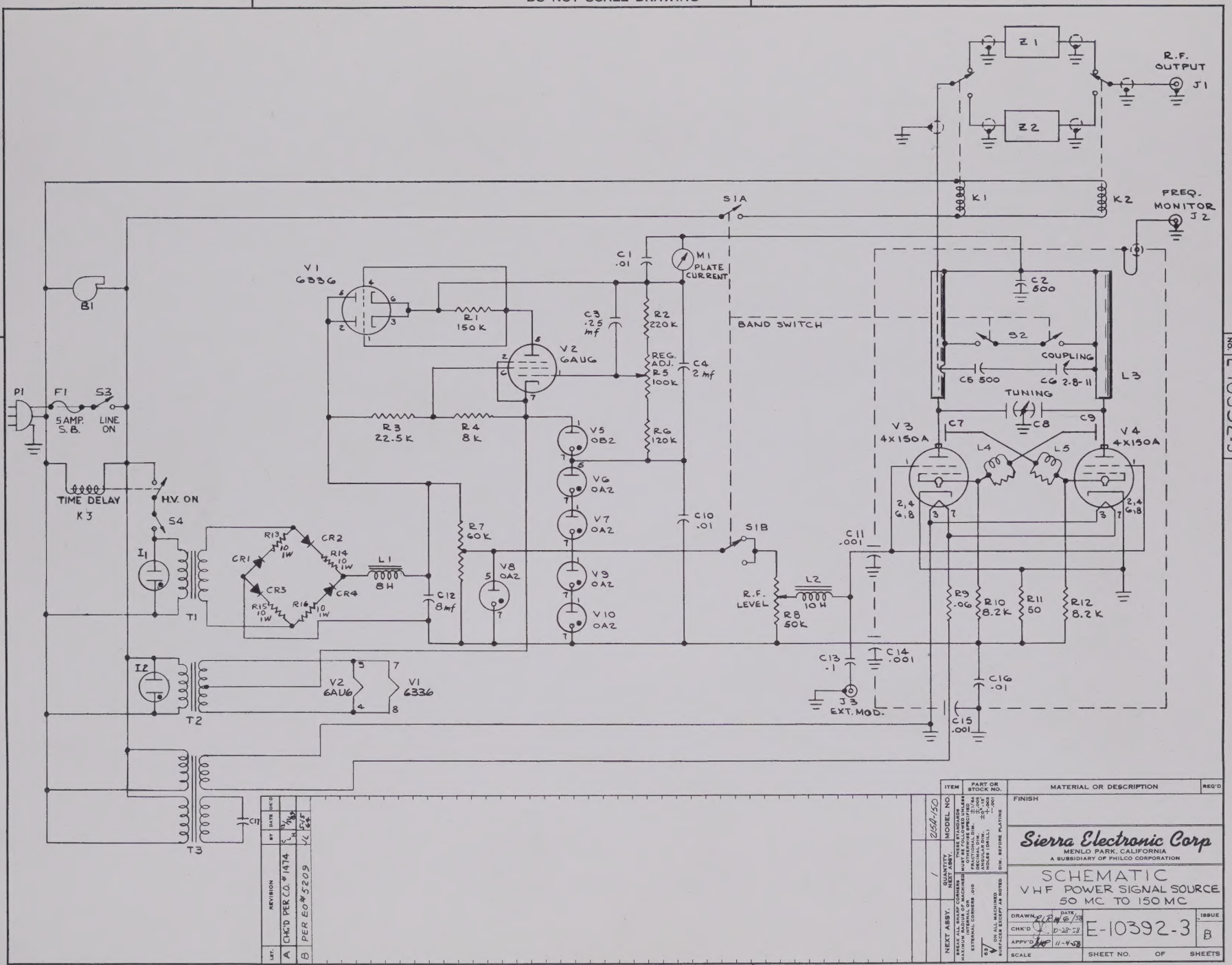
REPLACEABLE PARTS LIST

Schem. Ref. No.	Description	Sierra Stock No.	Mfr.	Dwg. or Mfr. No.	Tot. Quan.
R1	RESISTOR, 150,000 ohm,5%, 1/2 Watt Fixed Comp.	90500154	Allen Bradley	Type EB	1
R2	RESISTOR,220,000 ohm, 10%, 1/2 Watt Fixed Comp.	905200224	Allen Bradley	Type EB	1
R3	RESISTOR,22,500 ohm, 10%,10 Watt Fixed, Wirewound	906402252	Ohmite	"Brown Devil"	1
R4	RESISTOR, 8,000 ohm,10%,5 Watt, Fixed Wire-wound	906200802	Ohmite	"Brown Devil"	1
R5	POTENTIOMETER, 100,000 ohms, 10% 2 Watts, Composition Linear Taper	907900075	Ohmite	CLU1041	1
R6	RESISTOR, 120,000 ohm, 10%,1/2 Watt, Fixed Composition	905200124	Allen Bradley	Type EB	1
R7	RESISTOR, 60,000 ohm,10%, 100 Watt Adjustable Wirewound	906700603	Truohm	AR-100W-60K	1
R8	POTENTIOMETER, 50,000 ohms, 10%, 4 Watts Wirewound Linear Taper	907900076	Clarostat	A10-50K	1
R9	RESISTOR, .06 ohm, Fixed Wirewound		Sierra	SP-10457-1	1
R10	RESISTOR, 8,200 ohm,5% 2 Watts Fixed Comp.	905800822	Allen Bradley	Type HB	2
R11	RESISTOR, 50 ohm,10%,10 Watts Fixed Wirewound	906400500	Truohm	FRL-10	1
R12	Same as R10				
R13	RESISTOR, 10 ohms,10%,1 Watt, Fixed Composition	905600100	Allen Bradley	Type GB	4
R14	Same as R13				
R15	Same as R13				
R16	Same as R13				
S1	SWITCH, Rotary, Two Pole, Two Position, Ceramic Insulation	911200036	Sierra	SS-10454-2	1
S2	SWITCH, R.F.		Sierra	SU-10459-3	1
S3	SWITCH, Bathandle, 6A 125V	911000002	A.H. & H.	20994-LH	2
S4	Same as S3				
T1	TRANSFORMER, Plate, Primary 115 VAC, 60 cps Secondary 1150 VAC 300 ma	910000017	Paeco	SS-10276-1	1
T2	TRANSFORMER, Filament, Primary 105/115/125 VAC 50/60 cps secondary 6.3 VAC @ 10 amp.	910000030	Sola	Z0-04-065	1
V1	VACUUM TUBE, Twin Triode	910700062	Chatham	6336	1
V2	VACUUM TUBE, Pentode	910700020	Philco	6AU6	1
V3	VACUUM TUBE, Tetrode	910700063	Eimac	4X150A	2
V4	Same as V3				
V5	GAS TUBE, Voltage Reference	910700001	RCA	OB2	1
V6	GAS TUBE, Voltage Reference	910700006	RCA	OA2	5
V7	Same as V6				
V8	Same as V6				
V9	Same as V6				
V10	Same as V6				
XV1	TUBE SOCKET, Octal, Ceramic	914000022	Amphenol	148-111	1
XV2	TUBE SOCKET, 7 pin, Ceramic, Shield Base	914000030	Cinch	9355	7
XV3	TUBE SOCKET, with SK-606 Chimney	914000024	Eimac	SK610	2
XV4	Same as XV3				
XV5	Same as XV2				
XV6	Same as XV2				
XV7	Same as XV2				
XV8	Same as XV2				
XV9	Same as XV2				
XV10	Same as XV2				

REPLACEABLE PARTS LIST

Schem. Ref. No.	Description	Sierra Stock No.	Mfr.	Dwg. or Mfr. No.	Tot. Quan.
Z1	FILTER, Low-Pass RF		Sierra	184-158	1
Z2	FILTER, Low-Pass RF		Sierra	184-91	1
	DUST FILTER, Fiberglas, 4" x 4" x 1"	917300052	Owens-Corning		1

DO NOT SCALE DRAWING



DWG NO. E-10392-3

LET.	REVISION	BY	DATE	CK'D
A	CH'G'D PER CO. # 1474			
B	PER EO # 5209			

ITEM	PART OR STOCK NO.	MATERIAL OR DESCRIPTION	REQ'D
		FINISH	

NEXT ASSY. | QUANTITY REQ'D 1 | MODEL NO. 2654-150

THESE STANDARDS SATISFY ALL MACHINED SURFACES UNLESS OTHERWISE SPECIFIED. DECIMAL DIM. ±.005 ANGLES ±1° HOLES (DRILL) ±.003 (REAM) ±.001 DIM. BEFORE PLATING. BREAK ALL SHARP CORNERS MAXIMUM INTERNAL OR EXTERNAL CORNERS .010. ON ALL MACHINED SURFACES EXCEPT AS NOTED 63

Sierra Electronic Corp
MENLO PARK, CALIFORNIA
A SUBSIDIARY OF PHILCO CORPORATION

SCHEMATIC
VHF POWER SIGNAL SOURCE 50 MC TO 150 MC

	DATE	
DRAWN	9/28/53	E-10392-3
CHK'D	10-28-53	
APPV'D	11-4-53	ISSUE B
SCALE		SHEET NO. OF SHEETS

26420